

Endovascular treatment of traumatic carotid cavernous fistula with trapping technique

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Abstrak

Penatalaksanaan fistula arteri karotis kavernosa secara endovaskular konvensional melibatkan penempatan material secara langsung, baik itu koil, balon atau keduanya. Tujuan akhir adalah tertutupnya fistula dan terjaganya arteri karotis. Tetapi dalam beberapa kasus dengan laserasi arteri karotis yang parah, tatalaksana endovaskular yang memungkinkan adalah dengan menutup pengisian fistula dari sirkulasi otak. Metode ini dikenal dengan nama 'trapping technique' yang melibatkan metode penutupan arteri karotis, dikerjakan pada kasus ini dengan hasil yang baik. (*Med J Indones.* 2013;22:178-82. doi: 10.13181/mji.v22i3.588)

Abstract

Conventional endovascular treatment for carotid cavernous fistula (CCF) involves a direct delivery of either coils, detachable balloon or both to the fistula with end point of CCF resolution and carotid artery preservation. But in few cases with severe laceration of carotid artery, the feasible endovascular technique applicable is by blocking the filling of fistula from cerebral circulation. This method known as trapping technique which implicates carotid artery occlusion, was performed in our present case with good result. (*Med J Indones.* 2013;22:178-82. doi: 10.13181/mji.v22i3.588)

Keywords: Carotid cavernous fistula (CCF), carotid occlusion, trapping technique

Trauma is known as the most common cause of direct carotid cavernous fistula (CCF). A carotid artery injured by bony fragment has a through communication to the cavernous sinus with inherent fast flow via the fistula. It was grouped as type A in Barrow classification; commonly and simply known as CCF. It is a progressive medical problem where spontaneous resolution rarely occur. If left untreated, CCF can lead the patient to devastating conditions. Arterialization of the cavernous and cerebral venous flow may cause loss of eye vision, cerebral infarction or hemorrhage associated with venous hypertension, and sinus or venous aneurysm.^{1,2}

Endovascular treatment for CCF has widely replaced surgical treatment. Direct delivered coils or balloons to the fistula either using trans-arterial or transvenous approach has become the standard conventional endovascular treatment. An ideal goal of endovascular treatment is achieving preservation of the main carotid artery with complete occlusion of the CCF.³ The success of these methods relies on a clear delineation of the fistula's track and the accessibility of the intended vessels. Several maneuvers such as Mehringer-Hieshima maneuver [gentle ipsilateral internal carotid (IC) injection during manual compression of the ipsilateral carotid artery] and Heuber maneuver (ipsilateral carotid compression during vertebral artery injection) are theoretically useful to aid outlining on the site of carotid's tear.⁴

The other factor that influences success of endovascular treatment is the size of carotid tear. Oversize tear

associates with a risk of coils or balloon migration to the carotid artery. Subsequently, a large tear is accounted for total diversion flow into cavernous sinus with ensuing poor outline of the long course of cerebral carotid artery. Hence, this circumstance precludes interventionists from placing a non-detachable balloon as a safety mean to avoid coil or balloon migration during their deployment. Due to these aforementioned difficulties, a trapping technique is considered as an alternative endovascular method for CCF with large tear. The principal of trapping technique is obliteration of fistula's filling from the carotid artery and retrograde intracranial perfusion.^{5,6} We report one case of CCF with inherent difficulty that warranted endovascular trapping technique with description on the technical consideration and suggestions to achieve success ful treatment.

CASE REPORTS

A 46-year old male was admitted to our hospital for a close head injury following a high speed motor collision. He suffered from multiple facial and skull base fractures. Two days after, we noted that he had a loss of right eye's vision, proptosis and chemosis with decreased level of consciousness. A post traumatic direct CCF was suspected and a diagnostic angiogram was performed.

Technique

Diagnostic angiogram was performed for pre-treatment evaluation by puncturing right femoral artery. A 4